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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/770,486	01/29/2001	Ronald J. Kelley	CM01465L	6842

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MOTOROLA, INC
INTELLECTUAL PROPERTY SECTION
LAW DEPT
8000 WEST SUNRISE BLVD
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EXAMINER

WILKINS III, HARRY D

ART UNIT	PAPER NUMBER
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1742

DATE MAILED: 05/26/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/770,486

Applicant(s)

KELLEY ET AL.

Examiner

Harry D Wilkins, III

Art Unit

1742

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 19 April 2004.
2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,3,6-17 and 19-21 is/are pending in the application.
4a) Of the above claim(s) _____ is/are withdrawn from consideration.
5) ☐ Claim(s) _____ is/are allowed.
6) ☒ Claim(s) 1,3,6-17 and 19-21 is/are rejected.
7) ☐ Claim(s) _____ is/are objected to.
8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
10) ☒ The drawing(s) filed on 29 January 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1, 3, 6, 8, 9, 14-17 and 19-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Teitel (US 4,211,537) in view of Appleby (US 5,813,222).

Teitel teaches (see fig. 3, abstract and col. 3, lines 25-31) a fuel cell hydride storage reservoir (92) for recharging a fuel cell. Hydrogen is moved into the reservoir (92) from a source. The fuel cell hydride storage reservoir (92) stores the hydrogen as metal hydrides. Teitel teaches storing the hydrogen in microcapsules (94) in tank (88). Teitel teaches (see abstract and col. 10, lines 25-31) that the storage reservoir was provided with heat exchanging means to heat/cool the reservoir and that in order to use the previously absorbed hydrogen the metal hydride would have been heated (i.e.-prior to transfer of hydrogen). During transfer of hydrogen into the reservoir, Teitel teaches (see col. 10, lines 48-57) that cooling the reservoir causes absorption of the hydrogen gas.

Thus, Teitel does not teach that the hydrogen is produced by an apparatus including an electrolyzer, a dryer and accumulator.

Appleby teaches (see abstract, figure 1, col. 6, lines 4-30 and col. 7, lines 52-61) an apparatus for producing hydrogen that includes an electrolyzer (50) for producing

hydrogen and oxygen from water with the electrolyzer connected to a water supply (48) for on-board formation of hydrogen. The hydrogen gas is then passed through a dryer (liquid water trap 86) to remove any water and then the hydrogen is passed into an accumulator (52) for storage.

Therefore, it would have been obvious to one of ordinary skill in the art to have attached the hydrogen production apparatus of Appleby to the recharging apparatus of Teitel because the hydrogen production apparatus of Appleby provides a clean, dry and continuous source of hydrogen from only water, which would increase the safety of the system of Teitel due to the method of storing hydrogen on-board as water and not in the microcapsules (94).

Regarding the process limitation that "upon detection of the hear removal from the fuel cell hydride storage reservoir, the stored hydrogen gas is rapidly transferred from the hydrogen gas accumulator to the hydride storage reservoir", it is not further limiting on the apparatus claim because the above limitation deals with the manner or method of use of the claimed apparatus. It has been well settled that the manner or method of use of an apparatus cannot be relied upon to further limit claims to the apparatus itself. See *In re Casey*, 152 USPQ 235, and MPEP 2114. However, Teitel teaches (see col. 10, lines 48-57) that the hydrogen is transferred by cooling the hydride storage reservoir, thus teaching the method of "rapidly transferr[ing] [hydrogen] from the accumulator to the hydride storage reservoir".

Regarding claim 3, it would have been within the expected skill of a routineer in the art to have added a pump to evacuate the reservoir to ensure that all of the impurities in the reservoir had been removed.

Regarding claim 6, Appleby teaches (see col. 6, lines 13-15) a vent (port 54) for venting oxygen to the atmosphere. Therefore, it would have been obvious to one of ordinary skill in the art to have added an oxygen vent as taught by Appleby for venting oxygen to the atmosphere, thereby avoiding dangerous accumulation of oxygen gas. Appleby teaches that the vent is located on the water reservoir, not the electrolyzer. However, it would have been within the expected skill of a routineer in the art to have located the oxygen vent on the electrolyzer instead of the water reservoir. See MPEP 2144.04. VI. C. Shifting the position of the vent would not affect the operation of the system.

Regarding claim 8, it would have been within the expected skill of a routineer in the art to have added means for measuring the amount of hydrogen transferred because that would allow the operator to know how much hydrogen had been transferred allowing for more accurate calculation of data, i.e.-amount absorbed by metal hydride, amount discharged by metal hydride, total efficiency of system based on consumption of hydrogen, etc.

Regarding claim 9, though Appleby is silent as to the actual size of the system, it would have been within the expected skill of a routineer in the art to have scaled the size of the system to any desired size, such as one cubic foot or less as claimed. See

MPEP 2144.04. IV. A. The size of the system would not affect the operation of its components.

Regarding claim 14, Teitel in view of Appleby teach a system including a water supply connected to an electrolyzer to hydrolyze water into hydrogen and oxygen, a hydrogen accumulator, a heat exchanger coupled to the fuel cell hydride storage reservoir and a fuel cell hydride storage reservoir to be refilled as claimed. Regarding the limitation that the stored hydrogen gas is "rapidly transferred from the accumulator to the hydride storage reservoir", this is a method limitation. The above limitation is not further limiting on the apparatus claim because the above limitation deals with the manner or method of use of the claimed apparatus. It has been well settled that the manner or method of use of an apparatus cannot be relied upon to further limit claims to the apparatus itself. See *In re Casey*, 152 USPQ 235, and MPEP 2114.

Regarding claim 15, Teitel (see fig. 3, abstract and col. 3, lines 25-31) teaches a method of recharging hydrogen within a fuel cell comprising storing hydrogen gas in an accumulator, heating (col. 10, lines 25-31 and 48-57) heating a connected hydride storage container to evacuate and cooling the container to cause the stored hydrogen gas to improve the transfer of hydrogen from the accumulator to the hydride storage vessel. The hydrogen gas is then rapidly transferred from the accumulator to the connected hydride storage container.

Thus, Teitel fails to teach hydrolyzing liquid water to produce hydrogen gas, drying the hydrogen gas and storing the hydrogen gas thus produced.

Appleby teaches (see abstract, figure 1, col. 6, lines 4-30 and col. 7, lines 52-61) a method for producing hydrogen that includes an electrolyzer (50) for producing hydrogen and oxygen from water with the electrolyzer connected to a water supply (48) for on-board formation of hydrogen. The hydrogen gas is then passed through a dryer (liquid water trap 86) to remove any water and then the hydrogen is passed into an accumulator (52) for storage.

Therefore, it would have been obvious to one of ordinary skill in the art to have made the hydrogen gas by the production method of Appleby for the recharging method of Teitel because the hydrogen production method of Appleby provides a clean, dry and continuous source of hydrogen from only water, which would increase the safety of the method of Teitel due to storing hydrogen on-board as water and not in the microcapsules (94).

Regarding claim 16, Teitel teaches (see col. 10, lines 48-57) detecting the pressure drop in the hydride storage tank to find out when the hydrogen needs to be replenished. This step precedes the evacuating step.

Regarding claim 17, Teitel teaches (see abstract) storing the hydrogen in a metal hydride.

Regarding claim 19, Appleby teaches (see col. 6, lines 13-15) a vent (port 54) for venting oxygen to the atmosphere. Therefore, it would have been obvious to one of ordinary skill in the art to have added an oxygen vent as taught by Appleby for venting oxygen to the atmosphere, thereby avoiding dangerous accumulation of oxygen gas.

Regarding claim 20, it would have been within the expected skill of a routineer in the art to have measured the amount of hydrogen transferred because that would allow the operator to know how much hydrogen had been transferred allowing for more accurate calculation of data, i.e.-amount absorbed by metal hydride, amount discharged by metal hydride, total efficiency of system based on consumption of hydrogen, etc.

Regarding claim 21, Teitel teaches (see fig. 3, abstract and col. 3, lines 25-31) a method of recharging hydrogen for a fuel cell including storing hydrogen gas in an accumulator, heating a hydride storage reservoir for releasing anything absorbed by the hydride, connecting the hydride storage reservoir to the hydrogen accumulator, cooling the hydride storage reservoir to improve transfer of the hydrogen and storing the transferred hydrogen as a metal hydride. It would have been within the expected skill of a routineer in the art to have adapted the process to include opening a valve to ensure rapid transfer of the stored hydrogen gas.

Thus, Teitel fails to teach hydrolyzing liquid water to produce hydrogen gas, drying the hydrogen gas and storing the hydrogen gas thus produced.

Appleby teaches (see abstract, figure 1, col. 6, lines 4-30 and col. 7, lines 52-61) a method for producing hydrogen that includes an electrolyzer (50) for producing hydrogen and oxygen from water with the electrolyzer connected to a water supply (48) for on-board formation of hydrogen. The hydrogen gas is then passed through a dryer (liquid water trap 86) to remove any water and then the hydrogen is passed into an accumulator (52) for storage.

Therefore, it would have been obvious to one of ordinary skill in the art to have made the hydrogen gas by the production method of Appleby for the recharging method of Teitel because the hydrogen production method of Appleby provides a clean, dry and continuous source of hydrogen from only water, which would increase the safety of the method of Teitel due to storing hydrogen on-board as water and not in the microcapsules (94).

3. Claims 7 and 10-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Teitel (US 4,211,537) in view of Appleby (US 5,813,222) as applied to claims 1-6, 8 and 9 above, and further in view of Teitel (US 4,302,217).

As recited above, Teitel '537 in view of Appleby teach a system including a fuel cell metal hydride storage reservoir, a water supply connected to an electrolyzer for converting water to hydrogen and oxygen, hydrogen storage means including an accumulator, a dryer for drying the hydrogen, and a heat exchanger to heat and cool the reservoir.

Teitel '537 in view of Appleby do not teach a compressor attached to the accumulator.

Regarding claims 7 and 10, Teitel '217 teaches (see col. 12, lines 8-15) that by adding a compressor to increase the pressure of the hydrogen gas in a fuel cell metal hydride storage reservoir, the rate of absorption of hydrogen can be increased. Therefore, it would have been obvious to one of ordinary skill in the art to have added a compressor to the system of Teitel '537 in view of Appleby because the compressor would allow for an increased rate of hydrogen absorption. Regarding the limitation that

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the stored hydrogen gas is "rapidly transferred from the accumulator to the hydride storage reservoir", this is a method limitation. The above limitation is not further limiting on the apparatus claim because the above limitation deals with the manner or method of use of the claimed apparatus. It has been well settled that the manner or method of use of an apparatus cannot be relied upon to further limit claims to the apparatus itself. See *In re Casey*, 152 USPQ 235, and MPEP 2114.

Regarding claim 11, Appleby teaches (see col. 6, lines 13-15) a vent (port 54) for venting oxygen to the atmosphere. Therefore, it would have been obvious to one of ordinary skill in the art to have added an oxygen vent as taught by Appleby for venting oxygen to the atmosphere, thereby avoiding dangerous accumulation of oxygen gas. Appleby teaches that the vent is located on the water reservoir, not the electrolyzer. However, it would have been within the expected skill of a routineer in the art to have located the oxygen vent on the electrolyzer instead of the water reservoir. See MPEP 2144.04. VI. C. Shifting the position of the vent would not affect the operation of the system.

Regarding claim 12, it would have been within the expected skill of a routineer in the art to have added means for measuring the amount of hydrogen transferred because that would allow the operator to know how much hydrogen had been transferred allowing for more accurate calculation of data, i.e.-amount absorbed by metal hydride, amount discharged by metal hydride, total efficiency of system based on consumption of hydrogen, etc.

Regarding claim 13, it would have been within the expected skill of a routineer in the art to have added a vacuum pump to evacuate the reservoir to ensure that all of the impurities in the reservoir had been removed.

Response to Arguments

4. Applicant's arguments filed 19 April 2004 have been fully considered but they are not persuasive. Applicant argued that:

a. Teitel does not teach heating the reservoir for the purpose of evacuation.

Teitel teaches heating to increase the release of hydrogen.

In response, removing the hydrogen from the reservoir is the same as the evacuation as claimed. The hydrogen that is released is then moved to the fuel cell, thus, the container is evacuated of the hydrogen by the heating.

b. There is no motivation to combine Appleby with Teitel.

In response, as described in the previous action and above, the motivation comes from the desire to have a safer means for hydrogen storage/production. The electrolyzer of Appleby is much safer than the hydrogen gas filled capsules of Teitel.

Conclusion

5. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within

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TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Harry D Wilkins, III whose telephone number is 571-272-1251. The examiner can normally be reached on M-Th 10:30am-9:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy V King can be reached on 571-272-1244. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

hdw

Harry D Wilkins, III
Examiner
Art Unit 1742


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